to cut down the mistletoe, and probably to throw it at him.

Although this work deals with an explanation of the priesthood of Nemi, yet, on the other hand, there is plenty of substance to be got out of it which might help others who are pursuing a similar line of research in other directions. It might be interesting, for instance, to know if there is any connection between the Norse god Balder and the following legend of the Druids, referred to in Flammarion's "Astronomical Myths":—

The night of November 1 was, to the Druids, one full of mystery, in which they annually celebrated the reconstruction of the world. On this day the Druidess nuns had to pull down and rebuild the roof of their temple as a symbol of the destruction and renovation of the earth. If any of these hapless nuns happened to drop any of the materials for this new roof, they were immediately pounced upon and torn to pieces by their companions, who were seized with a fanatic transport. It was also on this day, or rather on this night, that the Druids extinguished the sacred fire, and then all other fires were put out, and a primitive night reigned throughout the land. Then the phantoms of those who had died during the preceding year passed along to the west, and were carried away by boats to the judgment seat of the god of the dead.

Another point we may mention concerns the solemn festival of the Isia, which, like the corroborees of the Australians, lasted three days, and was celebrated in honour of the dead and of Osiris, the lord of the tombs. There is a curious uncertainty about the date of this festival, the author telling us that "from the fact that, when the calendar became fixed, Athyr fell in November, no inference can be drawn as to the date at which the death of Osiris was originally celebrated." Now the Egyptians paid great attention to astronomy, and it has been stated that the day this festival commenced was at the culmination of the Pleiades at midnight.

In drawing to a conclusion our notice of this most interesting study in comparative religion, we must again direct attention to the great amount of labour the author must have undertaken in order to bring before us in a logical order the examples and myths with which these volumes abound. As a book of reference it will be found most valuable, being supplemented by a good index.

W.

GOODALE'S "PHYSIOLOGICAL BOTANY."

Physiological Botany. I. Outlines of the Histology of Phænogamous Plants; II. Vegetable Physiology. By George Lincoln Goodale, A.M., M.D., Professor of Botany in Harvard University. Gray's Botanical Textbook (Sixth Edition), Vol. II. (London: Macmillan and Co., 1890.)

THE first volume of Asa Gray's "Botanical Text-book appeared in 1842, and, in its later editions, "Structural Botany" is still a valued hand-book. Prof. Goodale's "Physiological Botany" forms the second volume, and the series is to be completed by Prof. Farlow's "Introduction to Cryptogamic Botany," and by that fourth volume on the natural orders of Phanerogams which Asa Gray "hoped rather than expected" to contribute.

Prof. Goodale's volume consists of two parts—a group of chapters (192 pages) on the histology of plants, and a section of 281 pages dealing with physiology. The present notice will be confined to the latter part of the book.

The English translation of Sachs's "Vorlesungen" and Prof. Vines's excellent lectures have done much to help the English student of botanical physiology. But in such a large and growing subject we are not likely to be overdone with text-books; we were prepared to welcome a new one, and it was in no unfriendly spirit that we opened Prof. Goodale's pages. We may say at once that our hopes have been disappointed, and that, in spite of a good deal that is worthy of praise, it is far from being a satisfactory book.

A text-book may interest us in one of two ways: it may be written with the vigour and breadth which make such excellent reading of Sachs's "Experimental Physiologie," published some twenty-five years ago; or it may, without being the work of a master, earn our thanks as a repertory of well-gathered and well-handled facts. Prof. Goodale's book seems to us to possess neither qualification in a very high degree.

We are disappointed too in another way. The date on the title-page (1890) naturally led us to look for discussions on the more important points which have arisen during the last three or four years. For instance, we expected a full account of the nitrogen question, a full account of the transpiration question, and at least some account of such interesting work as that of Wortmann, Elfving, and Noll, on geotropic curvature. But these things are not to be found, for the simple reason that the author's preface is dated 1885: we think that the public may fairly ask for some indication, on the title-page, of this condition of things.

It is no doubt a difficult thing to partition out a large subject among a limited number of pages; no two men would do it in the same way, and probably no one would be quite satisfied with the manner of distribution fixed on by another. But Prof. Goodale has exceeded the limits which may be allowed to individuality. For instance, his account of geotropism is compressed into twenty-five lines,—hardly more than is given up to De Candolle's "floral clock," and not nearly so much as is allowed to an account of the hybridization of *Lilium lancifolium* and *L. auratum.* This result—namely, the production of Parkman's lily—is no doubt of interest, but it is surely of less value to the student of physiology than a full discussion of so wide-reaching a mode of growth as geotropism.

Again, in the matter of arrangement some improvement is to be desired. For instance, in chapter xii. (on vegetable growth) we pass directly from the histology of cell-division to an account of the auxanometer. Further on we come across a brief account of turgescence, but without a hint as to its importance in relation to growth. In the paragraph on tension, the author gives no idea of the biological value of the combination of forces in giving rigidity to growing parts. The series of changes known as the grand period of growth is but slightly sketched, and no one coming to the subject for the first time would have a guess at the importance of the phenomenon.

To return to what is said on geotropism. It would surely have been more in accordance with modern views if an attempt had been made to show that geotropism, heliotropism, hydrotropism, &c., are all parts of one phenomenon: we find, however, no hint that these modes of growth are now regarded as so many different forms of reply to stimulus. Under geotropism, Knight's experiment is not even mentioned, and the student would probably never discover that gravitation *as a stimulus* had anything to do with the matter. Prof. Goodale (p. 392) believes that a negatively geotropic organ curves upwards because the "nutritive fluids" collect "in greater amount in the cells upon its lower side." In the case of positively geotropic organs he seems to believe in the ancient doctrine of plasticity, according to which a root bends down just as a tallow candle collapses in warm weather. He connects this view with the so-called absence of tension in roots; from this we should be led to suppose that he believes all roots to be positively geotropic, but this does not seem to be the case, for he says that "it is a significant fact that in the case of certain branches from roots the direction of growth is oblique."

The treatment of heliotropism is on the same level: he believes in De Candolle's exploded theory, which depends on the fact that growth is favoured by shade, and according to which the difference in illumination on the two sides of the organ is not a stimulus, but the direct cause of curvature.

In the chapter on the movements of plants the account of the clinostat is not good. Prof. Goodale omits to mention the especial merit of this instrument, viz. that it counteracts at one and the same time the effects of one-sided illumination and of the gravitation stimulus. The illustration of the clinostat is singularly unfortunate, being in fact Sachs's drawing of secondary roots bending, under the influence of centrifugal force, in Knight's experiment.

In the discussion on circumnutation it is a pity that no allusion is made to Wiesner's careful critique on the "Power of Movement in Plants." In the same way a modern account of twining plants should give references to Baranetzky's and Wortmann's papers.

Chapter ix., on the "Transfer of Water," is an improvement; still the heart of the matter is hardly touched, and the student who relies on this discussion will be but indifferently instructed. He will not, for instance, have any clear idea that the question whether or no the transpiration-current travels as water of imbibition is or ever was a problem deserving of especial attention.

Further on we find De Vries's experiments on the withering of stems cut in air, and on their preservation from withering when cut under water, but without any reference to von Höhnel's work on negative pressure, which has such important bearings on this point, and indeed on the whole question of water-transfer. In the section on the mechanism of stomata we miss the names of Schwendener and Leitgeb; and under the heading "Relation of Age of Leaves to Transpiration," there is no clear explanation of the relations of stomatal and cuticular transpiration.

In chapter x. a very fair account is given of the assimilation of carbon. The author deserves credit for giving the passage in which, in 1817, the word *chlorophyll* was proposed; just as in another part of the book he gives the passage in which the term *protoplasm* was first employed. With regard to chlorophyll we think it a pity that any encouragement should be given to the confusion between chlorophyll and chloroplasts by such a remark as the following: "The term chlorophyll originally applied to the pigment rather than to the substance which contains it, is now used indifferently to denote the coloring-matter and the portions of protoplasmic mass which are tinged by it." This statement is all the more unnecessary because he gives on the next page a useful table of the plastid-nomenclature of Schimper, Meyer, &c. Pringsheim's hypochlorin theories are reproduced, but without the word of warning that should accompany such speculations in a book intended for students.

There is a fair account of Timiriazeff's and of Engelmann's work on assimilation; but we doubt whether it would induce the beginner to appreciate the extraordinary interest and importance of Engelmann's researches. The section ends with an outline of the "early history" of assimilation, which contains some interesting quotations from Priestley and Ingenhousz.

The section on the "Appropriation of Nitrogen" suffers grievously from the fact that the nutrition of Fungi is left out of account. The "Synthesis of Albuminous Matter" is inadequately treated, and the same must unfortunately be said of the action of ferments; and with regard to the origin of alkaloids it would have been better to have given the well-known hypothesis that they are waste products, rather than to have left their meaning in complete obscurity.

Chapter xiv. is devoted to reproduction: the author seems to have been hampered with the fear of overlapping the forthcoming book on Cryptogams, as he confines himself almost entirely to the higher plants. He gives, in a footnote, some account of the reproduction of Spirogyra, Fucus, Nemalion, Funaria, Pteris, and Selaginella, but gives no idea of the connection between this latter form and the Spermaphytes. It is clear that without a free use of the lower forms it is impossible to give such a generalized view of the reproduction of plants as is appropriate in a physiological text-book.

In discussing the colours of flowers, it would have surely been better to have given H. Müller's interesting generalizations in place of the barren statistics of Kohler and Schübeler. The chapter concludes with some useful facts on hybridization.

The last chapter in the book consists of a few pages on germination. The greater part of this discussion might with advantage have been divided among those parts of the book which deal with the general conditions of plant life and with metabolism. Of the interesting growth-phenomena of germination, such as the protrusion of the radicle, the manner in which the cotyledons are freed from the seed-coats, &c., some account should have been given, even at the risk of overlapping vol. i. of the Text-book.

In spite of a general faultiness of the kind indicated the book is not without value. It is clearly written, and contains the substance of a large number of books and papers, references to which are given at the foot of the page (instead of at the end of the chapters) to the very great convenience of the reader. Many of these references to older papers are likely to be useful, and of salutary effect on the rising generation of botanists, who are somewhat inclined to overlook the work done in the days of their grandfathers.

The author deserves credit for his appendix, in which a series of simple physiological experiments are described, with a view to their repetition by the student.

FRANCIS DARWIN.

OUR BOOK SHELF.

Plant Organization: a Review of the Structure and Morphology of Plants by the written method. By R. Halsted Ward. (Boston, U.S.A.: Ginn and Co., 1890.)

THIS is nothing more than a series of blank charts, intended for students to fill in with the details of plant descriptions. The charts are prefaced by a few pages of letterpress, wherein are contained some of the author's views on plant morphology, together with general hints and a summary of the terminology to be used. We cannot say that the author's attempt to simplify the technical terms ordinarily made use of in descriptive work is altogether a success. For instance, the words "shingled" and "straddling" for *imbricate* and *equitant*, will hardly recommend themselves to teachers on this side of the Atlantic; nor are plants either epiphytic or parasitic on *rocks.* As to the blank charts which constitute the feature of the book, it can only be said that, as such things go, they are entirely praiseworthy. But are charts of this kind really necessary? A child just beginning the subject may profitably make use of the very simple schedules devised by the late Prof. Henslow; but by the time he has advanced so far as to be able to use these complicated and detailed ones, drawn up by Mr. Ward, we think he will do much better without being kept in leading-strings. The advantage gained by writing descriptions will be vastly enhanced if he be now permitted to think a little for himself.

F. W. O.

Geometrical Conics. Part I. The Parabola. By Rev. J. J. Milne, M.A., and R. F. Davis, M.A. (London: Macmillan and Co., 1890.)

IN this work a departure is made from the general order of the propositions adopted by most geometrical writers "so as to bring the argument into closer agreement with that found in analytical text-books, in order that both methods may be studied side by side." Instead of a series of detached propositions, the authors have made a continuous treatise, and by this means have been able to deal with some of the more important points more fully than they otherwise could have done.

This part, which treats of problems and theorems relating only to the parabola, is thoroughly well done, and contains many problems fully worked out which are absent from other similar books.

Those reading the subject for the first time ought to have no difficulty in grasping the various propositions and theorems, and at the end numerous examples on them, with hints and solutions, are added.

Short Logarithms and other Tables. By W. Cawthorne Unwin, F.R.S. Fourth Edition. (London: E. and F. N. Spon and Co., 1890.)

THE short tables given in this book will be found to serve the purpose for which they were intended, which is to facilitate practical calculations and to solve arithmetical problems in a very complete way. The logarithmetic table is very short, but, if used properly, the error need not exceed one per thousand; logarithms of three-figure numbers to 999, and of four-figure numbers to 2000, are given.

Amongst the other tables are: anti-logarithms, natural and logarithmetic trigonometric functions, functions of numbers, product of numbers, table of weights and measures, and conversion tables for English and metric measures. The last-named table is inserted specially for the use of engineers, as so many treatises on engineering are now being published in France and Germany in which the measures are given according to the metric system, and in consequence of which constants for the quick conversion of these measures are required.

W.

Elementary Algebra. By Charles Smith, M.A. (London: Macmillan and Co., 1890.)

THIS is a second edition of this well-known book, and differs from the first in some important particulars. It has been thoroughly revised, and the early chapters have been simplified and remodelled. Chapters on logarithms and scales of notation form a useful and valuable addition, and there is a great increase in the number of the examples. For beginners this work should prove invaluable, and even more advanced students would do well to glance over its pages.

W.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

British Association Procedure.

I SHOULD be sorry if Prof. Lodge or anyone else should suspect me of a desire to interfere with the opportunities which are afforded by meetings of the British Association for friendly intercourse between workers, and especially between the younger scientific men and their seniors, for I feel that those opportunities constitute one of the chief advantages of attending the meetings. But with the desire to avoid waste of time in merely journal business I should prefer that each Sectional Committee should be reduced to a small executive body to whom could be entrusted the task of arranging the programme for each day, and in a preliminary way other business, such as the selection of committees to carry out suggested new researches. The appointment of such Committees and the other business would be accomplished quickly enough at a meeting of the whole Section, and then opportunity would be given to all the members for expressing an opinion or offering suggestions. The plan at present adopted is neither one thing nor the other. The Sectional Committees are too large for the despatch of business, and yet may not include every desirable member of the Section. The demand for election to which I referred comes from a certain class of people whose single purpose is served when they get their names printed on the list.

I happen to have by me the journals of the Birmingham meeting, and the number of names on the Committees of the first three Sections I find as follows:—

	Section A	B	C
Vice-Presidents ...	6 ...	9 ...	7
Secretaries	4 ...	5 ...	4
Committee	52 ...	51 ...	93
Totals	62	65	104

When numbers like this are reached why pretend to draw a line at all?

WILLIAM A. TILDEN.

Birmingham, September 23.

The Exploration of Central Asia.

THE late notice in NATURE of August 14 (p. 378) with reference to the work of exploration now being carried out by the Russians around Kashgar, and that M. Grombchevsky, having received permission and funds to continue his work, was starting for Rudok, is not pleasant reading for Englishmen who know that part of the Himalayas. Rudok is a small place with a fort and Gonpa or monastery, and gives the name to the tract of country lying at the eastern end of the great Pangkong Lake, on the very confines of the territory of the Kashmir State. In 1863 I carried the survey up to that extreme eastern limit, and succeeded by avoiding observation in getting within a very few